REGENERATOR FOR HEAT EXCHANGER

The invention relates to a regenerator for regenerative type heat exchanger of the fluid pre-heaters.

It is known a regenerator for heat exchanger consisting of horizontal courses which rest on lower adjacent horizontal courses, they being fastened against the relative movement by means of a stabilizing rib network on their top faces, as well as by a joint network at the level of each course incorporating at its bottom portion the rib course of the lower adjacent course. Each course also contains vertical cavities which are uniformly distributed on its surface and by an in-sequence overlapping the courses form continuous straight vertical channels, they being both separately positioned within the material mass, and on the rib and joint paths of the networks (RO Patent 113,869 and US Patent 5,924,744).

This regenerator for heat exchanger has the disadvantage of not ensuring a communication through horizontal joint networks for a fourth of the vertical straight channels on the height of a three successive courses pack, but for a bigger pack only which can comprise even the whole height of the regenerator structure.

The consequence of this disadvantage results in that, on the one hand, cross-section for a fourth of the vertical straight channels going through the regenerator structure is increased with an irregular frequence, less than one time or none at three successive courses, by communicating through horizontal joint networks of each course and thus, not being achieved a significant increasing of the thermal transfer surface and of the swirling motion of the gas circulation for a fourth of the vertical channels and, on the other hand, the possibility of horizontal balancing of the outflow and temperatures of the regenerator is decreased, thus increasing the danger of structure failure by a non-uniform expansion.

The technical problem to be solved by the invention consists in providing a regenerator for heat exchanger that, by means of horizontal joint networks, ensures connecting all vertical straight channels by a maximum number of connections and with at least one connection to a pack having three sequential courses.

The regenerator for heat exchanger accordingly to the invention solves this problem in that within any pack of three courses, lower, median and upper respectively, which are sequentially horizontally overlapped, several vertical channels in the lower course overlap other several vertical channels in the median course, and several vertical channels in the median course overlap several vertical channels in the upper course, so that between all the vertical channels in said three courses of the three courses pack, lower, median and upper respectively, there are several horizontal connections realized by a joint network of the lower course and by the joint networks of the median and upper courses, respectively. The vertical channels have a frustum of cone shape which is technologically motivated, having the large base at the lower side and, the slope of the frustum of cone portion in the range of 1 - 5%.

The regenerator for heat exchanger according to the invention presents the following advantages:

- provides a maximum thermal transfer efficiency for the whole structure of the regenerator:
- increases the reliability of the structure;
- does not require any additional human or material efforts in caring out it.

An embodiment example of the invention will be disclosed in connection with the attached figure representing an interrupted view from above of the regenerator portion comprising five sequential courses, each of them being off-set by equal steps as against the adjacent one.

The regenerator according to the invention consists in a pack **A** of courses **1**, **2** and **3** or more, lower, median and upper respectively, which are sequentially horizontally overlapped and adjacent packs **B** and **C**, lower and upper, respectively as against the pack **A**, on the attached figure being shown the upper course **4** of the adjacent pack **B**, as well as the lower course **5** of the adjacent pack **C**.

Corresponding to each of the courses **1, 2** and **3** in the pack **A**, there are shown joint courses **6, 7** and **8**, as well as rib networks **9, 10** and **11** intended to guiding and underside closing the channels of the upper course.

Corresponding to the courses **1, 2** and **3** there are also shown vertical channels **a, g** and **m** at the intersection of the networks **6** and **9**, of the networks **7** and **10**, as

well as of the networks **8** and **11**, vertical channels **b, h** and **n** at the intersection of the networks **6, 7** and **8**, vertical channels **c,** i and **o** at the intersection of the networks **9, 10** and **11**, vertical channels **d, j** and **p** on the path of the networks **9, 10** and **11**, vertical channels **e, k** and **r** on the path of the networks **6, 7** and **8**, and vertical isolated channels **f, l** and **s** in courses **1, 2** and **3**. All the vertical channels are shaped as a frustum of cone on the height of a course having a frustum portion slope of 1 - 5%.

The packs **A, B** and **C** are made up so that, according to the pack **A**, the vertical channels **b** overlap the vertical channels **g**, and the vertical channels **h** overlap the vertical channels **m**. Thus, the channels obtained by sequential overlapping the vertical channels **a, i** and **n** are horizontally united by the networks **6** and **8**, the channels obtained by sequential overlapping the vertical channels **b, g** and **o** are horizontally united by the networks **6** and **7**, the channels obtained by sequential overlapping the vertical channels **c, h** and **m** are horizontally united by the networks **7** and **8**, the channels obtained by sequential overlapping the vertical channels **d, l** and **r** are horizontally united by the network **8**, the channels obtained by sequential overlapping the vertical channels **e, j** and **s** are horizontally united by the network **6**, and the channels obtained by sequential overlapping the vertical channels **f, k** and **p** are horizontally united by the network **7**. Also, the courses **4, 1** and **2**, as well as the courses **2, 3** and **5** can form a similar pack as a rule of overlapping the pack **A**.
By overlapping the courses **4, 1, 2, 3** and **5** there are realized continuous vertical channels the longitudinal section of which is a sequence of pyramidal frustum having a periodical section variation of 10 - 30 %.